AN EXAMINATION OF THE PERCEIVED COMPUTER LITERACY OF ENLISTED AIR FORCE ADMINISTRATION PERSONNEL AND AN ANALYSIS OF THEIR PERCEIVED TRAINING NEEDS

THESIS

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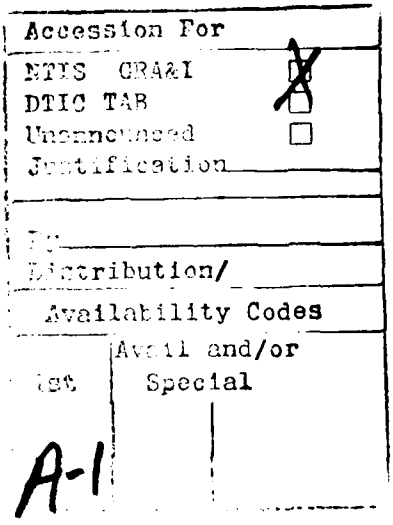

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THESIS

Presented to the Faculty of the School of
Systems and Logistics of the Air Force
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Requirements for the Degree of
Master of Science in Information Resource Management

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Preface

This study was conducted in order to make a determination of the perceived computer literacy of enlisted Air Force administration personnel and to examine their perceived training needs. It was an effort to establish if the enlisted administrators of the Air Force had the computer skills needed to do their job efficiently and, if not, what type of training they believed was necessary to reach that level of computer competency. This research provides only a "snapshot" of the computer literacy and training needs of enlisted Air Force administrators.

In order to conduct this study, a questionnaire was distributed to a sample of the population of enlisted Air Force administrators. Statistical analyses consisting of descriptive statistics, frequency distributions, crosstabulations, and analysis of variance were conducted using the Statistical Analysis Software (SAS) package.

A study such as this is impossible to accomplish without the support of friends and family. While the support of my classmates was super, at home came the greatest support of all. Without the patience and understanding of my wife Sally and my three daughters Robyn, Jamie, and Amber, completion of this study would not have been possible. A special thanks goes to all of them.

Howard A. Bass

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Abstract

With the realignment of the Air Force administration career field under the Administrative Assistant to the Secretary of the Air Force on November 19, 1987, came a new set of requirements for all Air Force administrators. No longer were they simply responsible for the written word. It was now their responsibility to manage all electronic information for the Air Force as well. The question was, did the administrators have the technical capabilities, or computer literacy, needed to handle these new requirements. In 1988 a study was conducted to determine the computer literacy of all administration officers, but it failed to consider enlisted personnel. Since these enlisted administrators would also be managing electronic information, their computer literacy needed to be assessed as well. This study made that assessment and additionally made a determination of the enlisted administrators' perceived computer training needs.

An examination of the results of this study revealed that only 64.3% of the respondents to the questionnaire perceived themselves as computer literate. Since 82.73% of the survey participants believed computer literacy was important on their present job, a definite gap exists which can only be closed through computer training. Unfortunately, most of these same individuals were of the opinion that this needed training was not being given at the

administrative technical school. Only 16% believed that the training received there was adequate for performance of their current job. In order for our enlisted administration personnel to do their jobs most efficiently, good computer training must be taking place. In order to provide this training, this study has suggested a revamping of the curriculum at the administration technical school as well as continuing computer education to be provided by individual bases either through the computer resource center or through a field training detachment.

AN EXAMINATION OF THE PERCEIVED COMPUTER LITERACY OF ENLISTED AIR FORCE ADMINISTRATION PERSONNEL AND AN ANALYSIS OF THEIR PERCEIVED TRAINING NEEDS

I. Introduction

General Issue

On November 19,1987, the Air Force administration career field was realigned under the Administrative Assistant to the Secretary of the Air Force (25). At first glance this seemed like little more than a simple restructuring, but in reality the impact on the career field was substantial. Air Force administrators were suddenly responsible for electronic as well as written information. As a result, administrative functions within the Air Force took on a whole new look as the career field became more and more automated. Computerized management systems such as the Records Information Management System (RIMS), Reprographic Automated Management System (RAMS), and Publications Distribution Operating System (PDOS) were now being worked by Air Force administrators. Additionally, the PC-III program, which was designed to streamline personnel actions through the use of computers dispersed to individual squadrons, would have also been handled by administrative specialists. This program, however, has been hampered by budgetary constraints and has had limited implementation by the Air Force. It is easy to see that Air Force

administrators were working with some of the most sophisticated equipment available in the field of electronic information. The question was, were they capable of handling these highly technical requirements? Did they have the computer skills necessary to do the job?

In 1988, Captain Cheryl Coleman conducted a survey of 383 administration officers to make a determination of their perceived computer literacy and perceived training needs. Her survey revealed that only 51% of the officers who responded to the survey believed they were computer literate while over 85% believed more computer training would improve their efficiency on the job (4:98-102). This survey provided valuable insight for the career field as it revealed what was needed to make the Air Force administration officer more efficient. It also brought to mind questions concerning the computer capabilities of the enlisted administrative specialist Enlisted administrators were currently receiving computer based instruction at their technical training school at Keesler Air Force Base, Mississippi, so they had at least come in contact with a computer by the time they reached their first assignment (10). Whether they had the computer skills necessary to do their job in the most effective manner, however, was still undecided. Colonel Pardini, Director of Information Management for the Air Force, stated that the computer literacy of enlisted personnel was an extremely important issue and one that was receiving a lot of attention from the

Air Force community (23). It was essential that the enlisted members of the administration career field be prepared to meet the demands of electronic information management.

Specific Problem

Determining if enlisted members of the administration career field had the computer skills necessary to do their jobs in an efficient manner was important not only to the career field, but to the entire Air Force. In order to address this issue, this study examined the perceived computer literacy of enlisted Air Force administration personnel and analyzed their perceived training needs.

Research Objective

The objective of this research was to determine the computer literacy of enlisted administration personnel and to find out if they were satisfied with that level of computer capability. It was a look at how things were as opposed to how they wanted them to be. This type of study is known as a needs assessment. Kaufman describes a needs assessment in the following manner:

> In order to plan for the future, we have to take stock of today. We must determine what it is we want the future to be like and how we will know when our future turns out to be successful. This determination of the gaps between "today" and the desired "tomorrow" is the essential nature and function of a needs assessment. (7:37)

Kaufman believes that in order to close the gap between "what is" and "what should be" a systematic process consisting of six steps should be accomplished. Those steps are as follows:

1. Identify the problem based upon needs.
2. Determine solution requirements and identify solution alternatives.
3. Select solution strategy(ies) from among alternatives.
4. Implement selected methods and means.
5. Determine performance effectiveness.
6. Revise as required. (7:38-41)

This research has shown the Air Force that there are some gaps with regards to computer competency among the enlisted administrators. Specific recommendations have been given by this report that will hopefully help close those gaps. These recommendations, however, are simply that and should be worked through a systematic process such as that described by Kaufman in order to ensure success.

Investigative Questions

To find an answer to the specific problem posed by this research paper, the following questions must be answered:

1. How knowledgeable is the enlisted administrator with regards to computers?

2. Is there a significant difference in the perceived computer literacy of enlisted administrators among the different commands?

3. How important are computers with regards to getting the job done? Could the administrator st ll do the job without computer skills?

4. Would additional training in computer skills help the administrative specialists perform their jobs more efficiently?

5. What computer skills are necessary to enable enlisted administration personnel to do their job more efficiently?

6. Does the administrator feel that adequate Air Force computer training has been provided? If not, what type of training would be most beneficial?

Definitions

Computer Literacy -- A review of literature has shown no consensus definition of computer literacy. One particular author, Ron Zemke, puts this challenge to his readers. Find a quiet room and take a few minutes to call a dozen or so computer-literacy vendors and ask them for a definition of computer literacy. Once you have done this, Zemke believes "In about an hour you will conclude that computer literacy is a true humpty-dumpty term, meaning almost anything the person using it wants it to mean" (28:24). For the purpose of this research effort, computer literacy was defined as

"A level of knowledge adequate for the skillful, productive use of computer applications required for a particular job, and a sufficient level of knowledge for the successful management of administrative systems and automated functions" (4:5-6). This definition was used to maintain a consistency between Captain Coleman's and my research so that comparisons between the studies can be made in the future.

Air Force Enlisted Administration Personnel -- All enlisted personnel with AFSCs 70230, 70250, 70270, 70290, and 70200.

Information Systems -- Gordon Davis defines information systems as "... an integrated, user-machine system for providing information to support operations, management, analysis and decision-making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a data base" (5:6).

Scope

This research examined the perceived computer literacy and perceived training needs of enlisted administration personnel. It did not consider the computer skills of Air Force officers or civilian personnel working in the administration career field. This study was intended to be a snapshot of the current computer skills and training needs of the enlisted administrator. It was not intended for this research to provide an indication of the computer literacy

or training needs of enlisted administration personnel either in the past or in the future.

Due to time and money constraints, only enlisted administrators assigned to the continental United States (CONUS) were considered for this research. The results of this study, therefore, may not be totally applicable to all enlisted administration members due to the absence of data from overseas personnel. It should, however, at the very least give the Air Force administrative community a fair idea of the computer literacy needs of most of their enlisted members. Unique or unusual jobs not common to the career field were not considered. (4:6-7)

Organization of Thesis

This thesis has been organized according to guidelines set forth by the Air Force Institute of Technology Style Guide for Theses and Dissertations. Chapter I provides an introduction of this research while discussing the general issue, specific problem, research objective, investigative questions, key term definitions, and scope of the study.

A review of pertinent literature is provided in Chapter II. Since very little research has been performed in this area by the Air Force, most of the literature review dealt with the civilian world but was directly applicable to the Air Force community.

Chapter III presents the methodology used to conduct this study. It discusses the survey instrument used and the

survey sample in addition to examining the statistics used in the analysis of data returned.

An interpretation of the data gathered from the survey is provided in Chapter IV. All responses from the returned questionnaires are recorded and analyzed.

Chapter V provides a synopsis of this research, addresses the investigative questions posed by the author, and then provides recommendations based on the findings of this research.

II. Background

A look at today's office environment will almost always reveal one common tool: the MIS. Microcomputers have become a way of life for many organizations, military as well as civilian. The difference, though, may be in the amount of computer skills, or computer literacy, possessed by the users of these systems. The civilian sector, at least certain organizations, appears to have a leg up when it comes to computer literacy among its workers. Major Chavis W. Harris, who participated in the Education with Industry (EWI) program, wrote the following concerning his tour with Westinghouse:

> I was immediately impressed with the amount of computer literacy the average white-collar worker must have in order to be proficient at his job. PC's can be found on virtually every desk. They are an integral part of the daily work habits of the majority of Westinghouse employees. The stark contrast that comes to mind is the very select and limited usage for the average individual in the Air Force. (14:4)

This officer witnessed an operation where knowing how to use a computer was essential. This has become true in the Air Force as well. It was recently reported that there are approximately 1.6 million microcomputers in the federal government (22:1). The Air Force has a substantial portion of these computers, which become nothing more than expensive paper weights if they do not have users with the ability to operate them. Computer literacy is a must. A review of current literature reveals only one major study which has

been done with regards to computer literacy in the Air Force (4). Captain Cheryl Coleman's study of Air Force administration officers found that only 51 percent of those who responded to her survey believed they were computer literate. Additionally, 85 percent were of the opinion that more training was needed to be more efficient in their job while 95 percent believed that computer literacy will become more important as time goes on (4:52). Captain Coleman's research revealed that computer literacy was lacking among the very people who were managing information for the Air Force. My study sought to determine if those same computer literacy needs existed among the enlisted personnel of the Air Force administration career field. It was first necessary, however, to get an idea of what computer literacy actually is.

Viewpoints on Computer Literacy

Computer literacy is a phrase prevalent in today's society but, as is mentioned in Chapter 1, is one that seems to lack one agreed-upon definition. There are some who believe that the term is much too overworked and is one that should be done away with completely. One author says the following with regards to computer literacy: "Trainers (computer) should throw computer literate out of their vocabulary and concentrate instead on learning what a personal computer is and what it can do for them" (13:25). In his opinion the public was getting caught up in trying to

understand a phrase rather than concentrating on what was really important: learning how to use the microcomputer. Regardless of whether the term computer literate is believed to be important or not, however, it appears over and over in literature and must be considered for what it is, a reference to computer competence. The extent of this competence, however, is up for much debate. One article, "Computer Literacy and the Microcomputer," says that the expression computer literate is one that has evolved with time.

> At one time, being computer literate meant understanding the internal workings of a computer, being able to do binary arithmetic, and knowing how the central processing unit manipulated data. Over time as the industry matured, being computer literate changed to mean knowing a computer language such as COBOL or RPG and being able to write programs. (9:82)

The article went on to say that the computer industry has evolved to the point where there are two distinct users, the user and the technician. The technician has a very high level of computer expertise and is much more competent than the everyday user who, according to Geller and Smith, is simply software literate (9:82). This nice, neat division of computer users into two categories is convenient but seems to leave out much of the computer-using population. There is a wide gap between the user who is simply software capable and one who is familiar with the internal workings of a computer.

Jim Hall-Sheehy takes a more thorough look at the different stages of learning to use a computer by dividing users into the following six categories:

1. Computer Knowledgeable -- being able to converse with members of the organization about the MIS and knowing how it is being used.
2. Computer Practical -- knowing the different components that make up a personal computer and learning how to turn it on and use the operating system.
3. Software Informed -- keeping abreast of the current software applications being used by your organization and being familiar with software issues such as security, documentation, and backup.
4. Applications Capable -- knowing how to make good use of the software systems being used and getting the most information possible from each application.
5. Applications Resource -- having the ability to troubleshoot minor software problems and being able to advise others on the best software package available to handle their needs.
6. Computer Conversant -- knowing how to program. (13:25)

These categories describe the computer skills or literacy of any possible computer user.

Another article that discusses the concept of computer literacy is "Computer Literacy: With ASK You Shall Receive." The authors believed that computer literacy was nothing more than awareness, skill, and knowledge, or ASK. To account

for different levels of user experience, they subdivided these categories to reflect how competence in each should vary according to the user's level of expertise. If a person is just learning to operate a computer, awareness for that user would simply be understanding what computers are used for and, in general, what their capabilities are. For the more advanced user, awareness would include knowing a little about the history of computers, what their projected capabilities and applications are, and familiarity with the computer marketplace. While having this awareness is important, it becomes useless unless a person also has the ability to work the machine. Operational skills are a must. The lower skill levels require that a person be able to use a keyboard to input data into the computer and then be able to process as well as retrieve that information when needed. A more skillful user will be able to make use of the different software applications available on the market. Those users with the greatest skill levels will be able to develop their own programs for problem solutions. The last component of this three-dimensional definition of computer literacy is knowledge. Computer operators with basic knowledge are familiar with some of the more common features of the computer such as memory, input/output devices, and so on. In general, though, they think of the computer as simply a black box that receives input and turns it into output. The person with more advanced knowledge has a

better understanding of how the system operates on a detailed internal level (20:84).

While there are many varied opinions and definitions of computer literacy, most do seem to agree on one thing: learning how to use a microcomputer is important now and will become even more important in the future. There are stumbling blocks to computer literacy, however, which must be recognized and overcome.

Obstacles to Computer Literacy

Three of the most common obstacles to computer literacy are availability of tools, resistance, and time (20:86). Availability of tools is an obstacle to computer literacy that is slowly but surely disappearing. Initially there just were not enough computers and educational tools on hand to aid with the training of computer users. Today, however, microcomputers are accessible in many various locations ranging from schools to libraries to private homes. The corporate world is using microcomputers extensively as well. The problem of non-availability of tools seems to be a problem in transition (20:86).

Resistance to computers is a serious problem that has hindered the advancement of computer literacy for some time. "User resistance to information system development and use has plagued the computing community for decades" (16:398). Theories regarding the reason for this resistance are many. One of the most common explanations is that people just do

not like change. "The human entity innately resists change. It is human nature to seek and maintain a state of equilibrium, to remain biostatic" (17:35). In his article "Overcoming User Resistance to Microcomputers," author Ralph Kleim writes the following:

> Many employees fear automation because they equate it with change. That's a mistake. What they fear is not automation, per se, but the experience of change that goes along with it. (19:52)

Opposition to change is not the only reason people are resistant to learning about computers. Some people resist new technology because they believe it poses a threat to their security, social status, self-esteem, and reputation (19:52). There is fear, whether justified or not, of that one-eyed monster suddenly sitting on their desk. Employees are afraid of losing their jobs, being transferred away from friends and familiar surroundings, not having the ability to learn how to operate this new machine, and possibly losing status or prestige (16:399). There is also the question of pride. "Many professionals (at all levels of seniority) secretly harbor a fear of appearing stupid by failing to master such a tool" (24:79). Some other reasons for resistance to computers include lack of communication between management and labor during the planning process (16:399), lack of total support by management during implementation of the system (19:53), and lack of quality training (16:400).

Obviously the problem of resistance to computers is a multi-dimensional one that is difficult to solve. It continues to be an obstacle to computer literacy.

The third limitation with regards to acquiring computer literacy deals with time constraints. While some companies are providing initial basic skill training, periodic refresher training seems to be overlooked in many cases. Companies just do not want to take the time and this can cause some serious problems (20:86).

> Unlike language literacy, computer literacy can not be maintained through simple use. And by extension, today's literacy training program must be updated to be of value in the years to come. (20:86)

Overcoming the Obstacles

As was mentioned in the previous section, a lack of computers and educational tools necessary for the spread of computer literacy is a problem that is quickly disappearing. This cannot be said, however, for the other two obstacles: resistance and time.

User Resistance

When it comes to overcoming user resistance, the first problem is its recognition. There are times when it is overt and easily detected. Eighteenth century followers of Ned Ludd perceived new technology as a threat to their existence and resisted industrial change by destroying new machinery (17:35). A more recent example involved U.S. postal workers who damaged their data-entry devices with strategically placed honey and paper clips (16:398). Overt resistance may also appear in other less violent ways such as a slowdown in production, a sudden rise in absenteeism, or as a final statement, people may just quit. While these forms of resistance are usually recognizable, the covert types are much harder to identify. One form of protest that has been used by those opposed to computers is the withholding of data to disrupt the effectiveness of an organization (19:52). Another form of resistance not easily identified is employee non-use of the system "although they'll log on to the system occasionally -- just enough to demonstrate to management that they are giving it a try" (24:79-80).

Whether overt or covert in nature, user resistance is a true obstacle to computer literacy and is a problem that must be dealt with. Management is charged with either preventing resistance from occurring or finding a way to defeat it should it happen.

One way to prevent user resistance to computers is to make all changes occur as smoothly as possible. Initially, hardware and software that are easy to use should be selected. Simple applications of the system should be attempted first, and then, as abilities grow, so should the level of taskings (19:53-54). Additionally, communication between end-users and management is crucial. The employees need to be a part of the computer system planning stage whenever possible. They work in their particular environment daily and know the requirements that exist. If workers can provide inputs concerning their future, they will be much less resistant to the changes the future brings. Also, management must let it be known that they are totally behind the new information system. Excitement and belief in the system must be generated from the top down (19:54).

While easier-to-use computer systems and more user involvement during the design of these systems will greatly help in the reduction of user resistance, the single best solution for overcoming this problem is adequate training.

"For OA (Office Automation) to be successful, end-user training must be a top priority" (1:12). If the Air Force, or any organization, is going to be prosperous in a world that is becoming more and more dependent on the gathering and use of information, it must ensure the computer literacy of its people. Unfortunately, enough training for the acquisition of computer skills does not seem to be taking

place. As was previously mentioned, Captain Coleman's research showed that only 51 percent of the administration officers who responded to her survey believed they were computer literate. While the civilian sector appears to be doing better in this area of computer literacy among its workers, as was the case with Westinghouse, they still have their problems. A survey of 100 end users who worked for 20 medium and large-sized companies revealed that these organizations simply were not meeting their employees' computer training needs (3:21). These situations must be corrected for the successful implementation of management information systems. Computer training is an absolute must.

Getting people to agree that training is essential for computer literacy is no problem. Just about everybody agrees that it must take place. There is a wide range of opinion, however, on how and where it should take place. One author maintained training should always take place away from the office. This gets the user away from office distractions such as questions from fellow employees and ringing telephones (1:13). Howard Lackow, on the other hand, has a different opinion. In his article "Customized Training Enhances Performance," he states that employees should be trained in-house. This saves the company money and keeps the trainee in familiar surroundings. Additionally, training is then geared towards the type of job the end user performs. Managers, for instance, would receive a totally different type of training than that given

to technicians. Everybody is not lumped together into one session and given generic training (21:104).

There are several methods currently being used to train today's computer users. The ideal situation, when possible, is the use of a live instructor. This allows direct interaction with the users being trained. When this is not possible, due to costs or lack of an instructor, two of the more common types of training being used are interactive tutorials, usually provided by vendors to instruct in the use of their software, and videotape presentations. The advantages of the tutorial are many. There is complete privacy, learning is self-paced, and tutorials are reusable. Videotape presentations, however, have an important advantage over the tutorial system. They allow the user the opportunity to watch someone actually working the system. While the costs of preparing a videotape presentation may be prohibitive, it is much more effective than a tutorial (11:263).

One factor that was not considered in the above analysis of training methods was user characteristics. David Callaghan believes that the type of training needed for a self-motivated person is different than that needed for one who is computerphobic, or afraid of computers. In his opinion, a self-motivated person should be taught using video/disk tutorials if they are beginners and with manuals if they are experienced. A computerphobic user, on the

other hand, should be trained with an instructor and have lots of hands-on work (2:27).

Time

Once initial computer literacy training has been completed, some companies tend to feel they have fulfilled the needs of their end users and leave it at that. This approach is undesirable.

> If training proceeds only to this point, the organizational benefits are limited. Obviously, users must become beginners before they can become experts, and the intimidation felt by many nonusers is diminished by this basic introduction. But if training stops here, it will accomplish little in helping novice users apply what they've learned to their jobs. (18:39)

Overcoming this problem of organizations not taking the time necessary to train their computer users properly is simply a matter of education. There has to be a changing of attitudes with regards to training. "In order for any office automation system to succeed, training must be considered from the very start and followed up throughout the life of the system" (1:14).

Summary

Computer literacy is definitely a term that does not lend itself to an easy definition. In reality, though, it simply means being able to use the computer to do a job as easily and quickly as possible whether that job be working in management or as the unit secretary. The acquisition of computer literacy often requires overcoming user resistance

to computers, which many times demands a changing of company attitudes with regards to training. If the correct computer training is there, end user resistance can be minimized and the organization will realize the benefits of a computer literate work force.

III. Methodology

Introduction

This study was accomplished in order to determine the perceived computer literacy level of enlisted Air Force administration personnel and to examine their perceived training needs. It was an effort to establish if the enlisted administrators of the Air Force had the computer skills needed to do their job in the most efficient manner and, if not, what type of training they felt was necessary to reach that level of computer competency. These issues were addressed once answers became available for the following six investigative questions.

1. How knowledgeable is the enlisted administrator with regards to computers?
2. Is there a significant difference in the perceived computer literacy of enlisted administrators among the different commands?
3. How important are computers with regards to getting the job done? Could the administrator still do the job without computer skills?
4. Would additional training in computer skills help the administrative specialists perform their jobs more efficiently?
5. What computer skills are necessary to enable enlisted administration personnel to do their job more efficiently?

6. Does the administrator feel that adequate Air Force computer training has been provided? If not, what type of training would be most beneficial?

In order to find answers to these investigative questions, a survey was conducted with the use of a questionnaire.

Justification For Use of a Questionnaire

Because the population considered for this research was dispersed in areas throughout the CONUS, it was necessary to use a questionnaire to gather data. The questionnaire, although not the strongest survey method, has its strengths. Those strengths are: 1) Subjects may tend to be more open with their responses since there is not the embarrassment of face-to-face contact; 2) It is able to gather data from some subjects who would not be approachable for an in-person interview; 3) Cost per questionnaire is low; and 4) Analysis of data through the use of a computer is easier. There are some weaknesses, however. Those include: 1) Use of probing questions is not possible and 2) There is always the possibility of nonresponse (26). The threat of nonresponse may be the biggest drawback in using a questionnaire as a low response rate can jeopardize the research effort.

Questionnaire Design

As was mentioned in Chapter I, a study very similar to this was conducted by Captain Cheryl Coleman in 1988. Due to the similarities in our research, it became possible to employ her questionnaire to conduct the survey for this study. It was necessary, however, to alter a few demographic questions in order to be applicable to the population under consideration for this particular research.

The questionnaire was patterned after one that had been developed and used by Ron Zemke (27:57) to determine computer training needs. Using this as a guideline, Captain Coleman then held informal interviews with 10 administration officers in order to get a better perspective on the types of questions needed to fully address the computer literacy issue. Additionally, former surveys that had been developed and used by the Air Force Institute of Technology's Department of Communication and Organizational Sciences were used as examples for format and instruction portions of the questionnaire (4:29-30).

For a questionnaire to be worthwhile, it must have reliability and validity. Reliability is a measure of the consistency of results of a survey instrument and can be calculated in different ways. One is to test for stability, which is usually measured through the test-retest method. This has several weaknesses, though, and is seldom used. Two other measures of reliability are the split-half and parallel tests. The split-half approach computes the

correlation between halves of a test while the parallel test method compares results of two forms of the same test instrument. The most often used measure of reliability, though, is the Cronbach Coefficient Alpha, which determines internal consistency. This measure of reliability was used in measuring the reliability of the questionnaire used for this survey. A Cronbach Coefficient Alpha can range from 0, which implies a total lack of reliability, to 1 which signifies total reliability. The Cronbach Coefficient Alpha for this study was 0.81, which is within acceptable limits (4:29-30).

Although this study had a fairly high level of reliability, that in itself did not mean it was also valid. Validity of a questionnaire must also be established before it can be considered useful. There are basically two types of validity: content and construct. Content validity deals with the extent to which adequate coverage of topic is considered (6:95). In order to ensure that the questionnaire used in this survey had content validity, it was examined by three research experts from the Air Force Institute of Technology's Department of Communication and Organizational Sciences. Additionally, the questionnaire was pretested by 10 enlisted administration personnel assigned to Wright-Patterson Air Force Base, Ohio. A list of the names of the administrators given the pretest is attached in Appendix A.

Another type of validity which must be considered by the researcher is construct validity. This determines if the questionnaire is measuring what was intended to be measured (6:97). "To help insure construct validity proven response alternatives were used to lessen the likelihood of bias" (4:31). To further check for construct validity, a pretest was given to 10 members of the survey population in order to evaluate if there was sufficient ability among the respondents to answer the survey's knowledge questions. Since the knowledge level questions were adequately handled, the presence of construct validity seems to be supported.

A copy of the questionnaire used in conducting this research is attached at Appendix B.

Population

The population of concern for this thesis is all enlisted administration personnel currently in the Air Force who have been on active duty for at least one year. The one-year-on-active-duty stipulation was deemed necessary to allow for the completion of basic training as well as technical training school and to give the member some adjustment time both to the job and to the Air Force. Members of this population range in rank from airman through chief master sergeant. It was determined, by means of an interview with Captain Hebert at Randolph Air Force Base, Texas, that there are 20,000+ members in this

population. The AFSCs making up the population of interest are 70230, 70250, 70270, 70290, and 70200 (15).

Sample

To ensure the validity of this study, a random sample of enlisted administration personnel was drawn from the population. Due to time and cost restrictions, administration specialists assigned outside of the CONUS were not included in the sample. Since the duty positions of administration personnel are not that different whether assigned overseas or in the CONUS, it was believed that the findings from the analysis of the sample could be logically applied to the population.

The following formula was used to determine the sample size needed to ensure, with 90% confidence/reliability, that the sample drawn is representative of the population being researched.

$$n = \frac{N(z^2) \times p(1-p)}{(N-1)(d^2) + (z^2) \times p(1-p)}$$

where: n = sample size N = population size
p = maximum sample size factor (.50)
d = desired tolerance (.05)
z = factor of assurance - 1.645 for a 90% confidence level (12:11-14)

Applying this formula to the population size of approximately 20,000, the sample size required would be 268. Because a 100% return rate was not feasible, 375 questionnaires were sent out with the expectation that at least 268 would be returned. While this did not happen, as

only 249 usable responses were received, it is believed by both the author and his research advisor that due to the homogeneous nature of the population, this sample size is sufficient. An Atlas Statistical Summary Inquiry of all enlisted administrators assigned to the CONUS and having at least one year active duty in the Air Force was used to draw the random sample of 375 interviewees.

Statistical Analysis

Statistical Analysis Software (SAS) was used to analyze the data gathered during this research effort. SAS easily supports the statistics used for this study. Some of the procedures used were descriptive statistics, simple frequency distributions, crosstabulations, and analysis of variance (ANOVA).

The descriptive statistics were used to categorize nominal type demographic data such as age and educational level. Each question response was also analyzed through the use of simple frequency distributions. Additionally, an analysis of variance test (ANOVA) was conducted to determine if there was a significant difference in the computer literacy of individuals categorized according to the following factors: rank, educational level, and major command of assigment. Crosstabulations were also conducted on each question using rank, educational level, and major command as variables. A crosstabulation is simply a joint

frequency distribution obtained through the use of two or more classificatory variables (4:33).

Analysis of variance (ANOVA) is a test statistic that is used to identify the relationship between predictor and criterion variables. The SAS command Proc Anova computes a type of ANOVA which makes it possible to compare variability among group means. If a difference is then found, the SAS command LSD can determine where the statistically significant difference in means actually occurs. In order to be able to use the more powerful parametric statistics, it is assumed that all Likert scale responses are at least interval level data. A significance level of .05 was used in analyzing this data.

The analysis of data received for this study is conducted in the following chapter. Based upon this analysis, recommendations were given to improve the computer literacy of the enlisted administrator.

IV. Questionnaire Response Analysis

Introduction

This research dealt with determining if enlisted members of the administration career field had the computer skills needed to perform their jobs in the most efficient manner. If not, this study sought to find what computer skills were lacking and what method of training would be best for conveying these skills to the trainees. To collect the data needed for this study, a questionnaire composed of eighty-one questions was used. Justification for the use of this research instrument is discussed in Chapter III. Chapter IV analyzes the data gathered by the survey using the Coleman thesis as a guideline (4:35-76).

The questionnaire used in this research is divided into seven sections. The first six have questions dealing with the following general areas: demographics, computer background, opinions about computers in the work area, knowledge of computer terminology, importance of computer terms with regards to the job, and preferences when learning a new skill. The last section consists of two open-ended questions which allowed the respondent to address any concerns not covered in the questionnaire and also to briefly describe their duties. Each of these sections is addressed in Chapter IV through the use of tables which will reflect the statistical analysis which has been performed.

Demographic Information

The demographic data gathered for this study consisted of the following: age, rank, sex, highest educational level, years of active military service, duty AFSC, years assigned to current job, and the major command of assignment. For the demographic portion of the study, simple frequency distributions were used.

Age. The largest group of respondents participating in this research were in the 25-34 year old bracket. This section made up 46.9% of those returning the questionnaire. Only two of the respondents, on the other hand, were 45 or older. Table I presents all of the frequency distributions dealing with age.

Table I

Respondent's Age

Age	Frequency	Percentage
18 - 24	64	25.7%
25 - 34	117	46.9%
35 - 44	66	26.6%
45 or older	2	.8%
	249	100.0%

Rank. Chief master sergeants currently make up about 1% of the enlisted force. Of the 249 respondees to this particular questionnaire, two were chief master sergeants which is fairly representative for this size sample. Not as

predictable, however, was the number of airman that participated in this survey. Only seven with the rank of airman, or 2.8%, returned the questionnaire, which is a little low since 5.4% of the enlisted force have the rank of airman (8). The largest group of respondents to this survey, according to rank, was staff sergeants. Seventy-two staff sergeants responded to this questionnaire which amounted to 28.9% of the respondents. As is shown by the following table, the second largest group of respondents was sergeants. Forty-nine sergeants, or 19.7 percent of the respondents, participated in this study. Frequencies by rank for all survey respondents are shown in Table II.

Table II

Respondent's Rank

Rank	Frequency	Percentage
Airman	7	2.8%
Airman First Class	23	9.2%
Senior Airman	18	7.2%
Sergeant	49	19.7%
Staff Sergeant	72	28.9%
Technical Sergeant	34	13.7%
Master Sergeant	32	12.9%
Senior Master Sergeant	12	4.8%
Chief Master Sergeant	2	.8%
	249	100.0%

Sex. A look at Table III shows that 34.9% of the respondents to this survey were female. This is unusually high since only 13.9% of the total enlisted force is female (8). Why there are so many females in the administration career field is beyond the scope of this study but may be an item for future research. It could be that stereotyping is a problem in the Air Force just as in society.

Table III

Sex of Respondents

Sex	Frequency	Percentage
Male	162	65.1%
Female	87	34.9%
	249	100.0%

Highest Educational Level. By far the largest group of respondents, when divided according to the highest level of education attained, was those who had a high school diploma in addition to having some college credit. A total of 173, or 69.5%, of those who responded to the survey were in this category. Only 10% of the respondents had only a high school education while on the other end of the spectrum, 2% of the sample had a master's degree. Table IV lists the educational level frequency distributions.

Table IV

Highest Level of Education

Educational Level	Frequency	Percentage
High School Diploma	25	10.0%
High School Diploma+	173	69.5%
Associate's Degree	33	13.3%
Bachelor's Degree	13	5.2%
Master's Degree	5	2.0%
	249	100.0%

Years of Active Military Service. This survey required that all survey participants have at least one year of active duty military service allowing for the completion of basic training as well as technical school. Total frequency distributions for active military service are in Table V.

Table V

Years of Active Military Service

Total Number of Years	Frequency	Percentage
Less than 5 years	66	26.5%
5 years, but less than 10	69	27.7%
10 years, but less than 15	47	18.9%
15 years, but less than 20	50	20.1%
More than 20 years	17	6.8%
	249	100.0%

Duty AFSC. All of the enlisted administration duty AFSCs, Air Force specialty codes, for those who had been on active duty for at least one year were represented by the returned questionnaires. The largest groups were those individuals holding five- and seven-level skill levels or holding the AFSCs 70250 and 70270. This corresponds with the large number of sergeants and staff sergeants who responded to this survey. A complete frequency distribution of all duty AFSCs is listed in Table VI.

Table VI

Respondent Duty AFSCs

Duty AFSC	Frequency	Percentage
70230	11	4.4%
70250	116	46.6%
70270	104	41.8%
70290	15	6.0%
70200	3	1.2%
	249	100.0%

Years Working Current Job. A look at the frequency distribution representing the number of years the respondents have been working in their present job shows a fairly even distribution although 75% of those participating in this study had been working in their present position three years or less. This seems to say that administrators are still moving between jobs on a fairly regular basis. Because of this tendency to change jobs it becomes more

important for the Air Force to standardize their management information systems as much as possible in order to make the transitions between jobs easier. Table VII lists the total frequency distributions of the number of years the respondents have been working at their present jobs.

Table VII

Years on Current Job

Years Working Current Job	Frequency	Percentage
Less than 1 year	70	28.1%
1 year but less than 2	66	26.5%
2 years but less than 3	53	21.3%
3 years but less than 4	33	13.3%
4 years or more	27	10.8%
	249	100.0%

Major Command of Assignment. For this study, only enlisted administrators assigned in the continental United States were surveyed, limiting the possible major commands of assignment. The Tactical Air Command (TAC) and Strategic Air Command (SAC) had the largest number of survey participants with Air University and the Air Force Logistics Command (AFLC) having the fewest. The total command frequency distribution is shown in Table VIII.

Table VIII

Major Command of Assignment

Major Command	Frequency	Percentage
SAC	51	20.5%
TAC	56	22.5%
MAC	28	11.2%
ATC	27	10.8%
Air University	6	2.4%
AFSC	18	7.2%
AFLC	6	2.4%
AFSPACECOM	7	2.8%
AFCC	18	7.2%
ESC	8	3.2%
Other	24	9.8%
	249	100.0%

Computer Background

The second part of the questionnaire, consisting of questions 11 through 22, deals with the respondents' previous computer experience. It makes a determination of the computer skills held by the respondent and the training source for those skills. The questions are of a true/false nature and have been crosstabulated with rank, educational level, and major command of assignment. Once again, statistical analysis will be reported through the use of tables with discussions following each table. Appendix C, Table XXIX contains a complete list of frequency distributions for Part II of the questionnaire.

Table IX

Computer Background

Question	Rank	True	False
Never used a computer	AMN	14.29%	85.71%
	A1C	13.04%	86.96%
	SRA	27.78%	72.22%
	SGT	18.37%	81.63%
	SSGT	22.22%	77.78%
	TSGT	26.47%	73.53%
	MSGT	12.50%	87.50%
	SMS	16.67%	83.33%
	CMS	0.00%	100.00%
Use computer in home	AMN	14.29%	85.71%
	AIC	17.39%	82.61%
	SRA	22.22%	77.78%
	SGT	14.29%	85.71%
	SSGT	23.61%	76.39%
	TSGT	38.24%	61.76%
	MSGT	37.50%	62.50%
	SMS	50.00%	50.00%
	CMS	50.00%	50.00%

Table IX shows that at least 72% of the respondents within each grade have used a computer before. Computer use in the home, however, is not as prevalent with only 26.1% of the total participants in this study making use of the computer in their homes (See Appendix C, Table XXIX). Table IX seems to indicate that home computer use is more common among the upper enlisted grades possibly because these individuals are in a better financial position to own a computer.

Table X

Computer Use on Job

Rank	Yes	Percent	No	Percent
AMN	7	100.00%	0	0%
A1C	21	91.30%	2	8.70%
SRA	17	94.44%	1	5.56%
SGT	45	91.84%	4	8.16%
SSGT	65	90.28%	7	9.72%
TSGT	33	97.06%	1	2.94%
MSGT	30	93.75%	2	6.25%
SMS	10	83.33%	2	16.67%
CMS	2	100.00%	0	0%

More than 92% of all enlisted administrators use a computer on the job while the percentage never drops below 83% when examining this question by grade. Table X shows that the lower grades are extensive users of the computer while at work, with over 92% of those in the grade of AMN through SGT making use of the computer while at work. When comparing these numbers with the Coleman thesis (4:42), it is interesting to see that in general the enlisted administration members use the computer on the job much more often than their officer counterparts. A crosstabulation of this question with major command of assignment shows that only 50% of those responding from AFLC used the computer on the job while at least 85% of respondents from all other commands participating in this study were using the computer to perform their duties. With the tremendous use of computers by the enlisted members of the administration

career field it is easy to see the importance of computer literacy for the efficient performance of their job.

Table XI

Computer Literacy

Rank	Yes	Percent	No	Percent
AMN	7	100.00%	0	0%
AIC	17	73.91%	6	36.09%
SRA	12	66.67%	6	33.33%
SGT	34	69.39%	15	30.61%
SSGT	42	58.33%	30	41.67%
TSGT	23	67.65%	11	32.35%
MSGT	19	59.38%	13	40.63%
SMS	5	41.67%	7	58.33%
CMS	1	50.00%	1	50.00%

Table XI makes apparent that computer literacy is a problem among enlisted administrators in the Air Force today. While at least 92% of all enlisted members working in the administration career field are using computers on the job, only 64.3% of the respondents to this survey perceived themselves as computer literate (See Appendix C, Table XXIX). Table XI seems to say that computer literacy is more of a problem among the higher ranks, but it is premature at this point to make that conclusion. This question is posed later using the Likert scale for responses, which allows more powerful statistical analysis.

Table XII

Source of Computer Training

Question	Frequency	Percentage
Computer skills are self-taught		
Yes	150	60.2%
No	99	39.8%
	249	100.0%
Acquired computer skills prior to entering Air Force		
Yes	40	16.1%
No	209	83.9%
	249	100.0%
Acquired computer skills after entering AF, but not through AF training		
Yes	127	51.0%
No	122	49.0%
	249	100.0%
Acquired computer skills through AF training		
Yes	120	48.2%
No	129	51.8%
	249	100.0%

Looking at Table XII reveals that almost 84% of the respondents learned their computer skills after entering the Air Force which at first glance looks as though the Air Force is doing its job with regards to computer training. Further examination, however, reveals that only 48.2% of

those responding to this survey acquired their computer skills through Air Force training. The others must have received computer training through some type of off-duty education programs or were able to learn the skills on their own. Doing a crosstabulation with the education variable shows that almost 70% of those with a bachelor's degree or higher said they did not receive their computer training through the Air Force, which makes sense as a great majority of universities are including some type of computer training in almost all degree programs.

Table XIII

Formal Training

	Software Package	Information Management	Data Processing	Systems and Design
Yes	61.4%	68.7%	39.0%	8%
No	38.6%	31.3%	61.0%	92%

Over 60% of the respondees have had some formal training in at least one software package and over 68% some type of instruction in information management. Data processing as well as systems and design training have received little attention.

Opinions about Computers

This part of the questionnaire , Part III, deals with enlisted administrators' opinions about computers in the work place and how important these computers are in the completion of duties. Questions in Part III were answered using the Likert scale with 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. For these questions, only 4's and 5's are considered positive responses. All frequency distributions for this section are shown in Appendix C, Table XXX.

Table XIV

Perceived Computer Literacy

Question	Positive Responses	Percentage
Do you consider yourself computer literate		
AMN	5	71.43%
A1C	15	65.21%
SRA	12	66.67%
SGT	33	67.35%
SSGT	41	56.94%
TSGT	20	58.83%
MSGT	18	56.26%
SMS	5	41.66%
CMS	1	50.00%

Table XIV shows that perceived computer literacy ranges from 41.66% to 71.43% depending on the rank of the individual polled. Since this question was answered using the Likert scale, only those answering with agree or strongly agree were considered as positive responses for

this question. Because this question is at the heart of this research, an analysis of variance, or ANOVA, was performed to determine if responses were affected by rank, educational level, or major command of assignment. An ANOVA simply checks to see if there is any significant difference, at the .05 level for this study, between group means. The hypothesis is that all group means are equal, i.e., for rank M1 = M2 = M3 = M4 = M5 = M6 = M7 = M8 = M9 with M1 being the mean response for the question from all airman, M2 being the mean response for the question from all airman first class, and so forth. The alternative hypothesis, or null hypothesis, states that at least one of the means is different. Once an ANOVA has been performed, some type of multiple comparison test must be performed to determine where the difference(s) exist if there are indeed any. For this study, the LSD command was used within the SAS program to perform the multiple comparison test. Table XV shows the results of performing these tests. As is apparent, there were no significant differences concerning this question of computer literacy regardless of rank, major command of assignment, or educational level. These results are rather surprising as there has definitely been a feeling within the administration career field that computer literacy seems to be more of a problem among the upper ranks. In order to double check these findings, an ANOVA was also run after grouping the ranks by Airmen, NCOs, and Senior NCOs. As Table XV shows, this also failed to show a

significant difference at the .05 level. There had also been some speculation that a difference may exist in the computer literacy of enlisted administration personnel according to their major command of assignment. This study has also failed to show that this difference does exist. Another surprising finding was that educational level had no significant impact on the perceived computer literacy level of the participants in this research.

Table XV

Differences in Means

Group Variable	Criterion Variable	F-Value	Prob > F
Individual Ranks	I consider myself computer literate	.96	.4710
Grouped Ranks	"	1.46	.2346
Educational Level	"	1.71	.1475
Major Command	"	1.73	.0754

Table XVI

Computer Literacy is Important in My Job

Rank	Positive Responses	Percentage
AMN	6	85.71%
A1C	17	73.91%
SRA	17	94.44%
SGT	44	89.79%
SSGT	58	80.55%
TSGT	26	76.47%
MSGT	27	84.38%
SMS	9	75.00%
CMS	2	100.00%

As is shown in Table XVI, a high percentage of enlisted administration personnel in all the grades agreed that computer literacy is important in the performance of their jobs. At least 75% of the research participants within each grade believed that computer literacy was important for the completion of their duties. Once again, it was not considered a positive response unless the respondee answered with an agree or strongly agree for this question. Overall, 82.73% of the respondents believed that computer literacy was important in their job (See Appendix C, Table XXX). Since just over 60% of all of those participating in this study believed that they were computer literate, an obvious disparity exists. This gap must be closed if the Air Force wants to receive the highest productivity possible from its enlisted administrative workers.

Table XVII

Use of Computer on Job

Question	Positive Responses	Percentage
I have used the computer to improve admin functions		
AMN	6	85.72%
A1C	19	81.61%
SRA	17	94.44%
SGT	42	85.71%
SSGT	57	79.16%
TSGT	27	79.41%
MSGT	27	84.37%
SMS	10	83.33%
CMS	2	100.00%

Although there is a perceived lack of computer literacy among enlisted administrators, Table XVII shows that a large percentage of these same administrators are using the computer to improve their administrative functions. Overall, over 83% of the respondents are improving administrative functions through use of a computer. Doing a crosstabulation of this question by major command reveals that only 33% of the respondents from AFLC made a positive response to this question. In order to be fair, however, it must be pointed out that of the 249 participants in this research, only 6 were assigned to AFLC. Education level did not seem to make any significant difference in the amount of computer use on the job.

Table XVIII

Importance of Computer Knowledge and Training

Question	Positive Responses	Percentage
More computer training could improve efficiency in some areas		
AMN	5	71.42%
A1C	17	73.91%
SRA	16	88.88%
SGT	41	83.67%
SSGT	55	76.38%
TSGT	27	79.41%
MSGT	25	78.12%
SMS	9	75.00%
CMS	2	100.00%
Computer knowledge is important		
AMN	6	85.71%
A1C	21	91.30%
SRA	18	100.00%
SGT	46	93.87%
SSGT	68	94.44%
TSGT	33	97.05%
MSGT	30	93.75%
SMS	11	91.66%
CMS	2	100.00%

It becomes apparent from Table XVIII that computer knowledge and increased training to improve that knowledge are considered very important by those who responded to this survey. At least 71% of those within every grade believed that increased computer training would be beneficial and over 94% of all respondees regardless of rank were of the opinion that computer knowledge is important for managing

automated functions such as those within the administration career field. Crosstabulations using education level and major command revealed no significant findings.

Table XIX

Meeting Current Job Demands

Question	Positive Responses	Percentage
There are some duties I cannot perform with my current computer knowledge		
AMN	1	14.29%
A1C	1	4.35%
SRA	6	33.33%
SGT	13	26.53%
SSGT	17	23.61%
TSGT	10	29.41%
MSGT	6	18.75%
SMS	6	50.00%
CMS	0	0%

Table XIX reveals that while a large percentage of all enlisted administrators believe that more computer training would improve their job efficiency, their perception is that they can still meet their current job demands with present computer knowledge. The mean response for this question was 2.67 on a five-point Likert scale which was described on

page forty-one. This further points out that average enlisted administrators are of the opinion they can do their jobs with their current computer knowledge.

Table XX

Training Preference

Question	Positive Responses	Percentage
Is OJT training more beneficial than classroom training		
AMN	3	42.87%
A1C	10	43.47%
SRA	9	50.00%
SGT	29	59.18%
SSGT	38	52.77%
TSGT	17	50.00%
MSGT	15	46.87%
SMS	6	50.00%
CMS	0	0%

The enlisted administrators were fairly evenly divided on this issue of computer training methods although they leaned towards on-the-job computer training. Table XX points out that at least 42% of the respondents within each grade answered agree or strongly agree on this question (this does not include the two chief master sergeants who were both noncommittal one way or the other with regards to this question). Overall, 51% of the respondees tended to answer this question in the affirmative while only 20.5% tended to disagree. The other 28.5% were noncommittal (see Appendix C, Table XXX).

Table XXI

Tech School Computer Training

Question	Positive Responses	Percentage
Tech school computer training was adequate for my current job		
AMN	1	14.28%
A1C	7	31.82%
SRA	2	18.18%
SGT	2	7.14%
SSGT	3	10.34%
TSGT	1	25.00%
MSGT	2	33.33%
SMS	0	0%
CMS	0	0%

Question 35 of the distributed questionnaire rendered some interesting information concerning the administration technical school. The numbers in Table XXI clearly show that very few of the respondents believed that the computer training they received at technical school was sufficient to adequately perform their current job. In order to see if rank made a significant difference in the way respondees felt about their computer training at technical school, as this would affect when they attended the school and what was taught, an ANOVA test was performed. Respondents were grouped into three categories, Airmen, NCOs, and Senior NCOs. This ANOVA test showed absolutely no significant difference at the .05 level between these three groups of enlisted administrators. One very interesting revelation

from this question was the fact that only 55% of those participating in this study actually attended this technical school. A look at those in the rank of technical sergeant and above revealed that only 18.75% of these particular respondents received technical school training.

Summary of Part III

Part III of the questionnaire revealed some interesting information. While only 60.24% of all the respondents believed they were computer literate, 82.73% were of the opinion that computer literacy was important in their present job and over 93% of these same respondees were using the computer to improve the efficiency of the administrative functions that they manage. This gap indicates that the administration career field has a number of enlisted administrators doing their best to make use of available computers even though they perceive themselves as computer illiterate. The answer to this problem is training. Initial administration training at Keesler AFB, Mississippi, is falling short as only 16.07% of those responding to this survey believed they received the computer training necessary to adequately perform their job. It must be pointed out, however, that only 24.09% of the respondents said they could not meet current job demands with their current level of computer knowledge. There are probably few members of the Air Force, though, who would admit to not being able to do their job. Lastly, another

significant finding in Part III of the questionnaire was that 45% of the respondees, who all work in the administration career field, never attended the administration technical school. As the career field becomes more and more automated, this will have to change.

Knowledge of Computer Terms

This part of the questionnaire deals with the survey participant's knowledge of computer terminology. A scale of 1 to 5 was used to record the respondee's answers with 1 = I am not familiar with this and 5 = I know quite a bit about this. Table XXII lists the frequency distributions for questions 36 through 55.

Table XXII

Knowledge of Computer Terminology

Term or Concept	Frequency	Percentage
Microcomputer		
1	37	14.9%
2	38	15.3%
3	76	30.5%
4	58	23.2%
5	40	16.1%
	249	100.0%

Table XXII (Cont)

Term or Concept	Frequency	Percentage
Mainframe computer		
1	76	30.5%
2	60	24.1%
3	58	23.3%
4	32	12.9%
5	23	9.2%
	249	100.0%
Floppy diskette		
1	7	2.8%
2	10	4.0%
3	35	14.1%
4	68	27.3%
5	129	51.8%
	249	100.0%
Disk drive		
1	6	2.4%
2	11	4.4%
3	52	20.9%
4	70	28.1%
5	110	44.2%
	249	100.0%
Bit		
1	57	22.9%
2	39	15.6%
3	65	26.1%
4	46	18.5%
5	42	16.9%
	249	100.0%

Table XXII (Cont)

Term or Concept	Frequency	Percentage
Byte		
1	50	20.1%
2	45	18.1%
3	57	22.9%
4	51	20.4%
5	46	18.5%
	249	100.0%
Baud Rate		
1	151	60.6%
2	36	14.5%
3	31	12.4%
4	16	6.4%
5	15	6.1%
	249	100.0%
Operating System		
1	31	12.4%
2	38	15.3%
3	75	30.1%
4	58	23.3%
5	47	18.9%
	249	100.0%
Hardware		
1	17	6.8%
2	21	8.5%
3	73	29.3%
4	65	26.1%
5	73	29.3%
	249	100.0%

Table XXII (Cont)

Term or Concept	Frequency	Percentage
Software		
1	10	4.0%
2	21	8.4%
3	63	25.3%
4	65	26.1%
5	90	36.2%
	249	100.0%
Word processing		
1	6	2.4%
2	7	2.8%
3	29	11.6%
4	73	29.4%
5	134	53.8%
	249	100.0%
Electronic Spreadsheet		
1	98	39.4%
2	56	22.5%
3	45	18.1%
4	24	9.6%
5	26	10.4%
	249	100.0%
Database		
1	40	16.1%
2	61	24.5%
3	59	23.6%
4	48	19.3%
5	41	16.5%
	249	100.0%

Table XXII (Cont)

Term or Concept	Frequency	Percentage
Interface		
1	99	39.8%
2	56	22.5%
3	50	20.1%
4	24	9.6%
5	20	8.0%
	249	100.0%
Random access memory (RAM)		
1	100	40.2%
2	39	15.7%
3	55	22.1%
4	24	9.6%
5	31	12.4%
	249	100.0%
Read only memory (ROM)		
1	114	45.8%
2	46	18.5%
3	43	17.3%
4	19	7.6%
5	27	10.8%
	249	100.0%
Local area network (LAN)		
1	108	43.4%
2	63	25.3%
3	33	13.3%
4	23	9.2%
5	22	8.8%
	249	100.0%

Table XXII (Cont)

Term or Concept	Frequency	Percentage
Program Language		
1	97	39.0%
2	61	24.5%
3	47	18.9%
4	21	8.4%
5	23	9.2%
	249	100.0%
System analysis		
1	129	51.8%
2	62	24.9%
3	33	13.3%
4	17	6.8%
5	8	3.2%
	249	100.0%
System Design		
1	144	57.8%
2	54	21.7%
3	26	10.4%
4	19	7.7%
5	6	2.4%
	249	100.0%

This questionnaire was designed so that the terminology appearing in questions 36 through 55 was arranged in order, from simple to more complex. As Table XXII points out, the more complex concepts such as baud rate and system analysis and design gave respondents the most problems. The terms random access memory (RAM) and read only memory (ROM) as

well as the concept of a local area network (LAN) were also confusing. Respondents were much more familiar with the more common computer terminology such as floppy diskette, word processing, and disk drive. The term microcomputer, which is one of the easier computer terms, had surprising results as there were about as many respondees who were not at all familiar with the term as there were who knew quite a bit about it.

In order to get a better idea of where the strengths and weaknesses were in this area of computer knowledge, the responses to the terms and concepts used in Part IV were further analyzed. Terms or concepts receiving the most 1's were considered areas of minimal knowledge. The ten areas with the least amount of knowledge appear in Table XXIII.

Table XXIII

Computer Terms or Concepts of Least Knowledge

	Term or Concept	Frequency (No. 1's)
1.	Baud rate	151
2.	System design	144
3.	System analysis	129
4.	Read only memory (ROM)	114
5.	Local area network (LAN)	108
6.	Random access memory (RAM)	100
7.	Interface	99
8.	Electronic spreadsheet	98
9.	Program language	97
10.	Mainframe computer	76

In a similar fashion, the ten areas with the most knowledge are shown in Table XXIV. In this case, the terms or concepts receiving the most 5's were considered to be the areas of greatest knowledge.

Table XXIV

Computer Terms or Concepts of Greatest Knowledge

Term or Concept	Frequency (No. 5's)
1. Word processing	134
2. Floppy diskette	129
3. Disk drive	110
4. Software	90
5. Hardware	73
6. Operating system	47
7. Byte	46
8. Bit	42
9. Database	41
10. Microcomputer	40

Importance of Computer Terms to Job Performance

Part V of the questionnaire uses the same terms and concepts as were used in Part IV, but this time asks the respondents to rate the term or concept with regards to its importance in the completion of their duties. Once again a scale from 1 to 5 was used with possible ratings ranging from 1 = This is very important to my job to a 5 = This is not very important to my job. Table XXV is used to show the frequency distributions of the responses to questions 56 through 75.

Table XXV

Importance of Terms/Concepts to Job

Term or Concept	Frequency	Percentage
Microcomputer		
1	94	37.8%
2	33	13.3%
3	32	12.9%
4	28	11.2%
5	62	24.8%
	249	100.0%
Mainframe computer		
1	58	23.3%
2	25	10.0%
3	36	14.4%
4	35	14.1%
5	95	38.2%
	249	100.0%
Floppy diskette		
1	120	48.2%
2	37	14.9%
3	19	7.6%
4	21	8.4%
5	52	20.9%
	249	100.0%
Disk drive		
1	116	46.6%
2	37	14.9%
3	22	8.8%
4	26	10.4%
5	48	19.3%
	249	100.0%

Table XXV (Cont)

Term or Concept	Frequency	Percentage
Bit		
1	53	21.3%
2	37	14.9%
3	61	24.5%
4	40	16.1%
5	58	23.2%
	249	100.0%
Byte		
1	57	22.9%
2	36	14.5%
3	62	24.9%
4	36	14.4%
5	58	23.3%
	249	100.0%
Baud rate		
1	44	17.7%
2	28	11.2%
3	46	18.5%
4	45	18.1%
5	86	34.5%
	249	100.0%
Operating system		
1	65	26.1%
2	39	15.6%
3	56	22.5%
4	38	15.3%
5	51	20.5%
	249	100.0%

Table XXV (Cont)

Term or Concept	Frequency	Percentage
Hardware		
1	99	39.8%
2	33	13.3%
3	40	16.1%
4	26	10.4%
5	51	20.4%
	249	100.0%
Software		
1	117	47.0%
2	34	13.7%
3	29	11.6%
4	23	9.2%
5	46	18.5%
	249	100.0%
Word processing		
1	142	57.0%
2	24	9.6%
3	12	4.8%
4	21	8.4%
5	50	20.2%
	249	100.0%
Electronic spreadsheet		
1	46	18.5%
2	25	10.0%
3	58	23.3%
4	37	14.9%
5	83	33.3%
	249	100.0%

Table XXV (Cont)

Term or Concept	Frequency	Percentage
Database		
1	65	26.1%
2	36	14.5%
3	53	21.3%
4	47	18.8%
5	48	19.3%
	249	100.0%
Interface		
1	45	18.1%
2	33	13.3%
3	55	22.1%
4	42	16.9%
5	74	29.6%
	249	100.00%
Random access memory (RAM)		
1	65	26.1%
2	32	12.9%
3	41	16.5%
4	43	17.3%
5	68	27.2%
	249	100.0%
Read only memory (ROM)		
1	54	21.7%
2	29	11.6%
3	43	17.3%
4	48	19.3%
5	75	30.1%
	249	100.0%

Table XXV (Cont)

Term or Concept	Frequency	Percentage
Local area network (LAN)		
1	62	24.9%
2	34	13.7%
3	35	14.1%
4	36	14.5%
5	82	32.8%
	249	100.0%
Program language		
1	46	18.5%
2	35	14.1%
3	54	21.7%
4	56	22.4%
5	58	23.3%
	249	100.0%
System analysis		
1	44	17.7%
2	28	11.2%
3	57	22.9%
4	43	17.3%
5	77	30.9%
	249	100.0%
System design		
1	44	17.7%
2	31	12.4%
3	47	18.9%
4	45	18.1%
5	82	32.9%
	249	100.0%

In order to get an idea of the terms or concepts which the respondents believed to be most important to their jobs,

the responses were once again analyzed with the results of the analysis appearing in Table XXVI. In this instance, the ten responses receiving the most 1's were considered as most important to the job.

Table XXVI

Most Important Terms or Concepts to Job

	Term or Concept	Frequency (No. 1's)	
1.	Word processing	142	
2.	Floppy diskette	120	
3.	Software	117	
4.	Disk drive	116	
5.	Hardware	99	
6.	Microcomputer	94	
7.	Operating system	65	
8.	Random access memory (RAM)	65	*
9.	Database	65	
10.	Local area network (LAN)	62	*

The items in Table XXVI that are marked with an asterisk represent those terms which also appear in Table XXIII. This is indicative of terms/concepts that were lacking in knowledge but were considered important in the accomplishment of duties. While it is evident that more training in these areas would be beneficial, the terms do appear towards the bottom of the list of important terms so this may not be a real problem.

Table XXVII represents those terms/concepts that the participants in this research believed were least important

in the accomplishment of their job. The ten items receiving the most 5's are listed below.

Table XXVII

Least Important Terms or Concepts to Job

	Term or Concept	Frequency (No. 5's)
1.	Mainframe computer	95
2.	Baud rate	86
3.	Electronic spreadsheet	83
4.	Local area network (LAN)	82
5.	System design	82
6.	System analysis	77
7.	Read only memory	75
8.	Interface	74
9.	Random access memory (RAM)	65
10.	Microcomputer	62

Table XXVII reveals that mainframe computer, with 95 or 38.15% of the respondents answering with a 5, and baud rate, with 86 or 34.54% of the respondents answering with a 5, were the terms considered least important by the respondents with regards to their jobs. It was interesting to note that microcomputer, random access memory (RAM), and local area network (LAN) appeared in both Tables XXVI (most important terms or concepts to job) and XXVII (least important terms or concepts to job) showing a wide spread of opinion concerning these terms/concepts.

Preferences in Learning a Skill

Part VI of the questionnaire was used to determine how the respondents participating in this study preferred to learn a new skill. Once again a Likert scale was used to record the respondees' answers with 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Table XXVIII shows the frequency distributions of all questions in this part of the questionnaire.

Table XXVIII

Learning Preferences

Question	Frequency	Percentage
I learn best alone		
1	28	11.2%
2	60	24.1%
3	80	32.1%
4	56	22.5%
5	25	10.1%
	249	100.0%
I like learning in a group		
1	6	2.4%
2	17	6.8%
3	74	29.7%
4	112	45.0%
5	40	16.1%
	249	100.0%

Table XXVIII (Cont)

Question	Frequency	Percentage
I like to learn by doing		
1	4	1.6%
3	11	4.4%
4	85	34.1%
5	149	59.9%
	249	100.0%
I prefer general instructions versus specific		
1	9	3.6%
2	25	10.0%
3	61	24.5%
4	88	35.3%
5	66	26.6%
	249	100.0%
I want to know how something works before using it		
1	5	2.0%
2	21	8.4%
3	89	35.8%
4	87	34.9%
5	47	18.9%
	249	100.0%
I don't care how it works, just show me how to use it		
1	57	22.9%
2	90	36.1%
3	49	19.7%
4	35	14.1%
5	18	7.2%
	249	100.0%

Table XXVIII clearly shows that the respondents of this survey preferred to be taught new skills in a group environment. Over 60% of those participating in this study revealed they prefer learning in a group as opposed to 32% who believed they learned best alone. Learning by doing was definitely preferred by the respondents as 94% said they like to learn using this method. Responses to the question concerning specificity of instructions indicated that the respondents desired to have general instructions as opposed to more specific. Over 60% of those surveyed revealed a lack of concern for specific instructions indicating instead a preference for more generalized guidance. When it came to the specifics of how something operates, however, there was a different opinion. Over 50% of the respondees said they wanted to know how something works before using it. They were not satisfied in just knowing how to operate it.

Open-Ended Questions

The questionnaire used in conducting this research made use of two open-ended questions. The first of these two questions gave the respondents an opportunity to expand on their concerns about computer literacy. A review of the comments provided by the survey participants reveals that the concerns seem to fall into two main areas, those being lack of computer training and the absence of standardization with regards to computer hardware and software. The issue of computer training is one that appeared over and over. As

the career field has become more and more automated, the need for good computer training has increased. One technical sergeant expressed his frustration in the following manner: "I don't see how we can be expected to keep up with the advances of today's technology without formal training." Another issue with regards to training dealt with the manner in which computer training is being presented. One chief master sergeant said, "Too much of computer training is taught by people who cannot teach basics using layman's language." Training would also help to change attitudes among some of the senior leadership in the enlisted ranks of administrators. It is hard to convince a young airman the value of computers when their noncommissioned officer in charge (NCOIC) does not feel the same way. One young airman first class writes, "My NCOIC hates computers, so I am discouraged by her, to use our computer to simplify my job." Although the types of concerns varied with regards to computer training, it all reduced to the facts which show that good computer training is lacking and is needed. The standardization issue appeared on several of the returned surveys as well. One survey respondent seemed to represent the feelings of many when he wrote, "Every time I leave an office and report to a new one, I have to learn a new system." This type of frustration is understandable and needs addressing.

The second of the two open-ended questions dealt with the specific duties performed by the respondent. Since the

career field is utilized throughout the Air Force, duties were varied and ranged from those performed by an administrator in a squadron orderly room to those performed by the director of information management for the 24th Air Division.

Summary

The average respondent to this survey turned out to be a staff sergeant between 25 and 34 years old with a high school education and some college. Survey participants held many varied positions within the Air Force and over 90% of them stated that a computer was used on the job. Although computer use was high, only 64.8% of those taking part in this study perceived themselves as computer literate. This apparent lack of computer literacy, however, did not seem to affect job performance as only 24% of the respondents stated they could not meet current job demands with their current computer skills. Computer training seemed to be a major concern among those participating in this research as at least 71% of those in each grade believed that more computer training could improve job efficiency. Additionally, this issue was discussed frequently in the open-ended question portion of the questionnaire. When receiving training, group learning was the method most often preferred with over 60% of respondents stating they liked to learn in a group as opposed to learning alone. The administration technical training school located at Keesler AFB, Mississippi,

received low marks for providing computer training. Only 16% of those responding to the survey who had attended the school believed that the school provided computer training adequate to perform their current job. One interesting note is that only 45% of the respondents actually attended the school.

V. Summary of Findings, Recommendations and Conclusions

Significance of Results

As the administrative career field becomes more and more automated, it becomes essential for all Air Force administrators, whether enlisted or commissioned, to have the skills needed to keep pace with the changes. One of Captain Coleman's conclusions was that Air Force administration officers are lacking with regards to computer skills (4:77). The purpose of this research was to determine if enlisted members of the career field had the same problem. In order to make this determination, a questionnaire was distributed to 375 enlisted members working in the administration career field. Statistical analysis was performed on the 249 returned questionnaires making it possible to address the following investigative questions. These were developed to get a reading on the current computer literacy and computer training needs of the enlisted administrator.

1. How knowledgeable is the enlisted administrator with regards to computers?

2. Is there a significant difference in the perceived computer literacy of enlisted administrators among the major commands?

3. How important are computers with regards to getting the job done? Could the administrator still do the job without computer skills?

4. Would additional training in computer skills help the administrative specialists perform their jobs more efficiently?

5. What computer skills are necessary to enable enlisted administration personnel to do their job more efficiently?

6. Does the administrator feel that adequate Air Force computer training has been provided? If not, what type of training would be most beneficial?

Investigative Question One. The enlisted administrators that participated in this study were not particularly knowledgeable with regards to computers. Overall, 64.3% of the respondents perceived themselves as computer literate. The grade that had the most individuals who perceived themselves as computer literate was airman. Of the seven respondents in this grade, five believed they were computer literate for a 71.43% positive response. Those in the rank of senior master sergeant had the lowest level of perceived computer literacy with only 41.66% of the respondents in that grade believing they were computer literate. While there are those in the career field that believe that computer literacy is more a problem among the older, and usually higher ranking, administrators, this study did not

bear that out. An analysis of variance (ANOVA) test revealed no significant difference at the .05 level.

Investigative Question Two. Seventy-five percent of the respondents who were assigned to the Military Airlift Command (MAC) perceived themselves as computer literate. On the other hand, only 16.67% of those participating in this research who were assigned to the Air Force Logistics Command (AFLC) believed they were computer literate. In fairness to this command, however, it must be stated that there were only six individuals from AFLC who took part in this study. MAC and AFLC reflect the highest and lowest percentages respectively with regards to perceived computer literacy among the major commands. While there is an apparent large disparity between the commands, an ANOVA test was performed and failed to reveal any significant difference, at the .05 level, in the perceived computer literacy of administrators assigned to different commands.

Investigative Question Three. This study reveals that computers are playing a significant part in the accomplishment of duties performed by the enlisted Air Force administrator. Of those responding to this survey, 82.73% believed that computer literacy was important in their job while over 94% were of the opinion that computer knowledge is important for managing automated functions such as those within the administration career field. While the overriding opinion seems to be that computers are indeed

important with regards to getting the job done in the administrative area, it was interesting to note that over 75% of the respondents believed they could still perform their duties with their current level of computer knowledge. This could be because very few individuals are willing to say they cannot perform their job, regardless of the reason.

Investigative Question Four. There is no doubt that additional training in computer skills would help enlisted administrators perform their duties more efficiently. At least that was the opinion of 79.12% of the survey participants who responded affirmatively to the statement that some job tasks could be performed more effectively if additional computer training was available. The respondents also believed that this need for computer skills will continue to grow in importance in the administrative career field as it becomes more and more automated. Ninety-three percent of the respondents believed that computer literacy will become more important to administration personnel in the future.

Investigative Question Five. This research pointed out that the computer term or concept deemed most important to job performance was word processing. It becomes obvious, then, that all administrative personnel should be proficient with some type of word processing software package. Although training in all of the many different word processing packages currently being used by the Air Force is

probably not feasible at this time, training in at least one of them is a must. Another area of computer knowledge that was considered important in the completion of duties was that dealing with the term database. These two software terms, word processing and database, along with general hardware terms such as disk drive, microcomputer, and operating system, all appeared in the top ten terms with regards to importance to the job (see Table XXVI). These are the terms or concepts that need to be addressed when computer training is being provided to the enlisted administrators.

Investigative Question Six. When asked if the computer training received at the administrative technical school was adequate for performance of their current job, only 16% of the respondents could answer in the affirmative. This, along with the fact that only 64.3% of the respondents perceived themselves as computer literate, indicates that current Air Force computer training is not adequate. These administrators need training and would prefer to be taught in a group environment. Over 60% of the participants in this research preferred learning in a group. Additionally, 94% of the respondents said they like to learn by doing. To satisfy these requirements, class sessions with hands on learning would be the most beneficial for the enlisted administration personnel.

Recommendations

For the computer literacy and competence of today's enlisted administration personnel to improve, there has to be a change in attitudes among Air Force personnel concerning the administrative career field. The administrator is no longer a glorified secretary, who simply needs to know how to type and make coffee. Today's administrative specialists have to be adequately trained in the management of electronic information as this is the future of the career field and the Air Force. Because of this, computer training is an absolute necessity and needs to begin at the administration technical school at Keesler AFB, Mississippi. Since only 16.07% of the respondents who attended this school believed the training they received was adequate for the performance of their current jobs, it is necessary for the curriculum to be examined and changed as needed. Once this has been done, its important that all administrators attend the school. As sophisticated as the career field is becoming, there is no way that we can be satisfied if only 55% of our administration personnel have attended. While it was not clear why so few of the respondents had attended the technical school there are basically only three possible reasons: 1, they were direct duty assignments out of basic training, 2) they failed in another technical school and were made administrators, or 3) they were cross trainees. If direct duty assignments are occurring in the administration career field, they need to

stop. The duties of the administrator are becoming complicated enough that on-the-job training will no longer be the answer. If technical school attendance is not possible, then training must take place at the gaining base perhaps through classes given by the computer resource center (CRC) or a field training detachment (FTD). The cross trainees find themselves in the same position as many of today's senior enlisted administrators. They are lacking the computer skills needed to be successful in the administration career field and need computer training to become competent. Computer training programs are needed for these personnel as well. Once initial computer training has been provided, the Air Force must be careful not to rest on its laurels. As was pointed out in Chapter II of this paper, follow-up training is essential for the success of any program and must be accomplished if the Air Force hopes to have efficient information managers.

Future Research

This study was basically a replication of one conducted by Captain Cheryl Coleman (4) in 1988 with the main difference being that her study involved the administrative officer. Because of the importance of computer literacy to the administration career field, a follow-up study should be conducted every two or three years to determine how both the enlisted and commissioned administrators are progressing with regards to computer literacy. Another area that needs

looking into is the curriculum at the administrative technical training school at Keesler AFB, Mississippi. A study needs to be conducted among all Air Force administrators to find out exactly what courses are needed at the technical school in order to enable administration personnel to perform their jobs more efficiently. Once it has been determined what needs to be taught, research needs to be done to find out the best way to teach the required skills. Multiple training options are available both through the Department of Defense and the civilian sector (4:86-87). These options need thorough examination to guarantee our administrators have access to the best training available. Another area that needs research deals with the backgrounds of individuals who are being brought into the administrative career field. Because the career field is becoming more specialized, it may become necessary to require higher qualifications for those selected to work in this area. It definitely would be a bonus if future administrators have at least a minimum background in computers. If not, however, they must at least show the capability to learn computer skills which may require higher scores in certain parts of the Air Force entrance exams.

APPENDIX A

The following enlisted administration personnel were kind enough to aid in the pretesting of the questionnaire which was used in this research effort:

SMSGT Patrick O'Reilly

TSGT Kevin Filer

SSgt Judy Fantroy

SSgt Steven Rutledge

SSgt Roy Washington

Sgt Vincent Brown

Sgt Kevin Hall

Sgt William James

A1C Roger Wilson

APPENDIX B

Reply to Attention of: 1st Lt Bass — 13 Feb 90
SCN 90-22
Subject: Computer Needs Assessment Survey — Expires 30 Jun 90

To: Survey Participant

1. Please take 10 or 15 minutes to complete the attached questionnaire and return it in the enclosed envelope by 15 Mar 1990.

2. The survey measures the computer knowledge levels and perceived training needs of enlisted Air Force Administration personnel. The primary objective of this research is to determine whether enlisted administrators have the computer skills necessary to complete job tasks in the most efficient manner and to identify specific areas of training that the administrators perceive as crucial for the improvement of computer competency. The data gathered in this study will be used as part of an AFIT research project and may have an influence on future training requirements for enlisted administration personnel.

3. Your responses to the questions on this questionnaire will be combined with others and will not be attributed to you personally. All returned questionnaires will be handled in a strictly confidential manner. While your participation in this effort is strictly voluntary, we would certainly appreciate your help. If there are any questions concerning this questionnaire or its intent, please contact 1st Lieutenant Bass at AUTOVON 785-4437. Thank you for your support.

JAMES T. LINDSEY, Lt Col, USAF
Head, Department of Communications
and Organizational Sciences
of Systems and Logistics

2 Atch
1. Survey
2. Return School Envelope

COMPUTER LITERACY NEEDS ASSESSMENT

PLEASE ANSWER ALL QUESTIONS ON THE ENCLOSED ANSWER SHEET FILLING IN ALL CIRCLES COMPLETELY USING A #2 PENCIL. IF AN ANSWER IS CHANGED, PLEASE BE SURE ALL SMUDGES ARE REMOVED.

Part I. This part of the questionnaire asks for background information. Questions will provide current data on demographic information about enlisted administrative personnel.

1. What is your age group?
   1. At least 18 but less than 25
   2. At least 25 but less than 35
   3. At least 35 but less than 45
   4. 45 or older

2. What is your current rank?
   1. Airman
   2. Airman First Class
   3. Senior Airman
   4. Sergeant
   5. Staff Sergeant
   6. None of the above

3. What is your current rank?
   1. Technical Sergeant
   2. Master Sergeant
   3. Senior Master Sergeant
   4. Chief Master Sergeant
   5. None of the above

4. What is your sex?
   1. Male
   2. Female

5 What is your highest educational level?
   1. High school diploma (including GED)
   2. High school diploma plus some college credit
   3. Associate's Degree
   4. Bachelor's degree
   5. Master's degree
   6. Master's degree plus some doctoral study

6. How many years active military service do you have?
   1. At least 1 but less than 5
   2. At least 5 but less than 10
   3. At least 10 but less than 15
   4. At least 15 but less than 20
   5. 20 years or more

7. What is your duty AFSC?
   1. 70230
   2. 70250
   3. 70270
   4. 70290
   5. 70200

8. How many years have you been on your current job?
   1. Less than 1 year
   2. At least 1 but less than 2
   3. At least 2 but less than 3
   4. At least 3 but less than 4
   5. 4 years or more

9. What Major Command are you assigned to?
   1. SAC
   2. TAC
   3. MAC
   4. ATC
   5. Air University
   6. None of the above

10. What Major Command are you assigned to?
   1. AFSC
   2. AFLC
   3. AFSPACECOM
   4. AFCC
   5. Electronic Security Command
   6. None of the above

Part II. Computer background/experience. Please read the following list of statements that may relate to your background and experience with computers.

Answer with a 1 if the statement is true about you.
Answer with a 2 if the statement is false about you.

11. I have never used a microcomputer

12. I use a computer in my home.

13. I use a computer on my job.

14. I have had formal training in at least one software application.

15. I perceive myself as computer literate.

16. I have had formal training in at least one course in information management.

17. I have had formal training in at least one course in data processing.

18. I have had training in systems analysis and design.

19. The computer knowledge that I have is self-taught.

20. I acquired computer skills before entering the Air Force.

21. I acquired computer skills after entering the Air Force, but not through Air Force training.

22. I acquired computer skills through Air Force training.

Part III. The following questions concern your opinions about the introduction of desktop, microcomputers or computer systems to your specific work environment.

For each item, use the following scale to indicate the level of your agreement or disagreement.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

23. I consider myself computer literate.

24. I am comfortable using a computer.

25. Computer literacy is important in my present job.

26. Computer literacy is more important in my present job than in past assignments.

27. I could perform some job tasks more effectively if I had additional computer training.

28. I have used the computer to improve the efficiency of administrative functions that I manage.

29. Computer knowledge is important for managing automated functions.

30. I would be better able to manage automated administrative functions if I had more computer knowledge.

31. Automation of administrative functions has increased the amount of computer knowledge needed to do my job well.

32. In the future, computer literacy will become more important to administration personnel.

33. I have job demands that I cannot effectively meet as I do not have an appropriate level of computer knowledge.

34. On-the-job computer training is more beneficial than classroom training.

35. Computer training received at the administrative technical school was adequate for performance of my current job. (Please mark N/A if school was not attended)

Part IV. Below is a list of computer terms. Some refer to concepts, some to specific kinds of equipment, and some to programming. Read through the list and use the scale to indicate your knowledge about each item.

1 = I am not familiar with this

5 = I know quite a bit about this

TERM OR CONCEPT	WHAT I KNOW ABOUT IT				
36. Microcomputer	1	2	3	4	5
37. Mainframe computer	1	2	3	4	5
38. Floppy diskette	1	2	3	4	5
39. Disk drive	1	2	3	4	5
40. Bit	1	2	3	4	5
41. Byte	1	2	3	4	5
42. Baud rate	1	2	3	4	5
43. Operating system	1	2	3	4	5
44. Hardware	1	2	3	4	5
45. Software	1	2	3	4	5
46. Word processing	1	2	3	4	5
47. Electronic spreadsheet	1	2	3	4	5
48. Database	1	2	3	4	5
49. Interface	1	2	3	4	5
50. Random access memory (RAM)	1	2	3	4	5
51. Read only memory (ROM)	1	2	3	4	5
52. Local area network (LAN)	1	2	3	4	5
53. Program language	1	2	3	4	5
54. System analysis	1	2	3	4	5
55. System design	1	2	3	4	5

Part V. Below is a list of computer terms. Some refer to concepts, some to specific kinds of equipment, and some to programming. Read through the list and use the scale to indicate the importance of each item to your job.

1= Very important to my job 5= Not very important to my job

TERM OR CONCEPT	IMPORTANCE TO MY JOB				
56. Microcomputer	1	2	3	4	5
57. Mainframe computer	1	2	3	4	5
58. Floppy diskette	1	2	3	4	5
59. Disk drive	1	2	3	4	5
60. Bit	1	2	3	4	5
61. Byte	1	2	3	4	5
62. Baud rate	1	2	3	4	5
63. Operating System	1	2	3	4	5
64. Hardware	1	2	3	4	5
65. Software	1	2	3	4	5
66. Word processing	1	2	3	4	5
67. Electronic spreadsheet	1	2	3	4	5
68. Database	1	2	3	4	5
69. Interface	1	2	3	4	5
70. Random access memory (RAM)	1	2	3	4	5
71. Read only memory (ROM)	1	2	3	4	5
72. Local area network (LAN)	1	2	3	4	5
73. Program language	1	2	3	4	5
74. System analysis	1	2	3	4	5
75. System design	1	2	3	4	5

Part VI. The following questions concern your preferences concerning the learning of a skill. Use the scale below to indicate your preferences.

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

76. I find I learn best when I work alone.

77. I find that working in a group helps because I see other people's views.

78. Learning by doing has always been a good way for me to learn.

79. I prefer very specific instructions to general guidelines and concepts.

80. I like to know a lot about the principles behind a thing before I try putting it into practice.

81. I have no use for the theories and principles behind a thing. I just want to know how to use it to get what I want from it.

Part VII. Open-ended questions. Please respond to the questions in the space below.

82. Please comment on any concern you have about computer literacy that has not been covered in this questionnaire.

83. Please briefly describe your duties.

Thank you for your help. Please return this questionnaire and your answer sheet in the enclosed envelope to 1st Lt Howard Bass, AFIT/LS, WPAFB OH 45433-6503

THANK YOU FOR YOUR COOPERATION

APPENDIX C

Table XXIX

Complete Computer Background

Question	Frequency	Percentage
Never used a microcomputer		
Yes	49	19.7%
No	200	80.3%
	249	100.0%
Use computer in home		
Yes	65	26.1%
No	184	73.9%
	249	100.0%
Use computer on the job		
Yes	230	92.4%
No	19	7.6%
	249	100.0%
Have had formal training in at least one software package		
Yes	153	61.4%
No	96	38.6%
	249	100.0%
I perceive myself as computer literate		
Yes	160	64.3%
No	89	35.7%
	249	100.0%

Table XXIX (Cont)

Question	Frequency	Percentage
Have had formal training in at least one course in information management		
Yes	171	68.7%
No	78	31.3%
	249	100.0%
Have had formal training in at least one course in data processing		
Yes	97	39.0%
No	152	61.0%
	249	100.0%
Have had training in systems analysis and design		
Yes	20	8.0%
No	2	92.0%
	249	100.0%
My computer knowledge is self-taught		
Yes	150	60.2%
No	99	39.8%
	249	100.0%
Acquired computer skills before entering Air Force		
Yes	40	16.1%
No	209	83.9%
	249	100.0%

Table XXIX (Cont)

Question	Frequency	Percentage
Acquired computer skills after entering Air Force, but not through Air Force training		
Yes	127	51.0%
No	122	49.0%
	249	100.0%
I acquired computer skills through Air Force training		
Yes	120	48.2%
No	129	51.8%
	249	100.0%

Table XXX

Opinions about Computers in the Work Place

Question	Frequency	Percentage
I consider myself computer literate		
1	16	6.4%
2	41	16.5%
3	42	16.9%
4	120	48.2%
5	30	12.0%
	249	100.0%
I'm comfortable using a computer		
1	7	2.8%
2	15	6.0%
3	27	10.8%
4	122	49.1%
5	78	31.3%
	249	100.0%
Computer literacy is important on present job		
1	10	4.0%
2	6	2.4%
3	27	10.8%
4	104	41.8%
5	102	41.0%
	249	100.0%
Computer literacy more important in present job than in past		
1	14	5.6%
2	48	19.3%
3	57	22.9%
4	56	22.5%
5	74	29.7%
	249	100.0%

Table XXX (Cont)

Question	Frequency	Percentage
Additional computer training would improve job effectiveness		
1	8	3.2%
2	9	3.6%
3	35	14.1%
4	79	31.7%
5	118	47.4%
	249	100.0
I use the computer to improve the efficiency of administrative functions		
1	6	2.4%
2	12	4.8%
3	24	9.6%
4	86	34.5%
5	121	48.7%
	249	100.0%
Computer knowledge is important for managing automated functions		
1	5	2.0%
2	1	0.4%
3	8	3.2%
4	95	38.2%
5	140	56.2%
	249	100.0%
More computer knowledge would improve my management of automated functions		
1	6	2.4%
2	9	3.6%
3	23	9.2%
4	90	36.2%
5	121	48.6%
	249	100.0%

Table XXX (Cont)

Question	Frequency	Percentage
Automation of administrative functions requires me to have more computer knowledge		
1	7	2.8%
2	12	4.8%
3	41	16.5%
4	99	39.8%
5	90	36.1%
	249	100.0%
Computer literacy will be more important in the future		
1	5	2.0%
2	2	0.8%
3	9	3.6%
4	51	20.5%
5	182	73.1%
	249	100.0%
I cannot do my job well do to my lack of computer knowledge		
1	32	12.9%
2	94	37.8%
3	63	25.3%
4	43	17.3%
5	17	6.7%
	249	100.0%
On-the-job training is more beneficial than classroom training		
1	15	6.0%
2	36	14.5%
3	71	28.5%
4	65	26.1%
5	62	24.9%
	249	100.0%

Table XXX (Cont)

Question	Frequency	Percentage
Computer training received at the administration technical school was sufficient for performance of my present job		
1	35	31.3%
2	18	16.1%
3	41	36.6%
4	10	8.9%
5	8	7.1%
	112	100.0%

(137 of the respondents have not attended this school)

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Vita

First Lieutenant Howard A. Bass [redacted] graduated from Shadle Park High School located in Spokane, Washington, in 1971. After attending Spokane Falls Junior College on a music scholarship for one year, Lieutenant Bass enlisted in the United States Air Force where he performed as a musician with Air Force bands located at Lacklard Air Force Base, Texas, Elmendorf Air Force Base, Alaska, and Barksdale Air Force Base, Louisiana. In August of 1983, he separated from the Air Force and entered ROTC at Central Washington University where he graduated with a degree in finance and an Air Force commission in the spring of 1986. Lieutenant Bass served as an executive officer for the 602 Tactical Air Control Center squadron located at Bergstrom Air Force Base, Texas, prior to entering the School of Systems and Logistics, Air Force Institute of Technology in May of 1989.

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13. ABSTRACT (Maximum 200 words) With the realignment of the Air Force administration career field under the Administrative Assistant to the Secretary of the Air Force on November 19, 1987, came a new set of requirements for all Air Force administrators. They were now responsible for electronic information as well as the written word. The question was, did the administrators have the technical capabilities, or computer literacy, needed to handle these new requirements. This study made that assessment and additionally made a determination of the enlisted administrators' perceived computer training needs. The results revealed that only 64.3% of the respondents perceived themselves as computer literate. Since 82.73% of the survey participants believed computer literacy was important on their present job, a definite gap exists which can only be closed through computer training. In order to provide this training, this study has suggested a revamping of the curriculum at the administration technical school as well as continuing computer education to be provided by individual bases either through the computer resource center or through a field training detachment.

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